

Repertoire-Altering Effects of Remote Contingencies

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In a previous paper in this journal (Michael, 1983) I made a distinction between evocative and repertoire-altering effects of an environmental event; or said another way, between evocative and repertoire-altering functional relations between environmental variables and behavior. There are no perfectly appropriate descriptive terms for this distinction, so it is best made by enumerating examples of each kind of effect. In respondent conditioning, the effect of an unconditioned stimulus in eliciting a response is evocative, but its effect in developing a new conditioned stimulus is repertoire altering. Consider the example of conditioning pupillary constriction to the sound of a tone, with an increase in illumination as the unconditioned stimulus. The procedure consists of repeatedly pairing the tone with the light increase, and in the same context being sure that neither the tone nor the light increase occur very often by themselves. In that it elicits pupillary constriction the light increase illustrates an evocative effect; its effect in conditioning the organism so that the tone eventually produces pupillary constriction illustrates a repertoire-altering effect. In a sense this is an effect that is "once removed" in time from the situation that produced it. (A twice-removed effect can be seen when the pairing or correlating procedure of respondent conditioning produces a stimulus with new operant repertoire-altering functions. When a stimulus event that has an operant repertoire-altering function—reinforcement or punishment—has been paired with some other stimulus event, the latter becomes capable of functioning as reinforcement or punishment in its own right. Proof of this effect can only be provided when the new stimulus is used to alter a repertoire, itself an effect that can only be observed at a later time when the situation is again as it was at the moment of reinforcement or punishment, thus twice removed.)

The contrast between evocative and repertoire-altering effects is also well illustrated by the double function of the stimulus change in the middle of an operant stimulus-response chain. Consider a typical demonstration where a rat's pull on a cord hanging from the ceiling of its experimental chamber turns on a tone, and in the presence of the tone (but not in its absence) a press on a lever produces food reinforcement (and turns the tone off). The effect of the tone onset in causing the animal to press the lever is evocative; its effect in increasing (or maintaining) the cord pulling behavior (when the tone is again off) is repertoire altering. In the operant situation the two different effects of the same stimulus change are referred to by different terms, "discriminative stimulus" and "conditioned reinforcer," which makes it easier to communicate unambiguously about such effects. In the respondent situation ambiguity is actually encouraged by the fact that "unconditioned stimulus" refers to both effects. Different terms for the two effects would, I think, be an improvement, and in the paper mentioned above I suggested "unconditioned elicitor" and "unconditioned conditioner."

As mentioned at the beginning, there are no common terms that make exactly this distinction, but evocative effects are those typically seen immediately after the stimulus change, and they are also momentary in the sense of being produced by stimulus changes which are themselves momentary. The light increase as unconditioned elicitor is of this latter type, with the pupil constricting when the light increases, and dilating again when the light decreases. In the case of the tone onset in the operant chain, as a discriminative stimulus it causes behavior which produces a further stimulus change with a corresponding behavior

change—the rat presses the lever which causes the food reinforcement to be delivered and the tone to go off. Repertoire-altering effects are not identified in terms of any specific instance of behavior, but rather with the changed capacity for future evocative effects, and in this sense are not necessarily immediate, and are lasting rather than momentary.

An attempt to make a similar distinction consists in contrasting stimulus with reinforcement control, or antecedent with consequent control. These terms seem less satisfactory to me for two reasons: neither set of terms can be extended to a similar distinction in the respondent case, and “antecedent” and “consequent” only identify temporal location irrespective of behavioral function. Resistance to such terminological revision and for that matter to the evocative and repertoire-altering distinction itself sometimes occurs because of known or hypothesized functional relations between the two kinds of effects. For example, it may be the case that there is a necessary relation between eliciting and conditioning effects; that is, unless an unconditioned stimulus can elicit some behavior it cannot condition that type of behavior to a previously neutral stimulus. In the operant case, it has been proposed that unless a stimulus is discriminative for some behavior it cannot function as a conditioned reinforcer. But irrespective of such possible relations it is still convenient to be able to refer to a specific effect with a single term. Ambiguity in this area is a source of confusion which detracts from the ultimate theoretical and practical effectiveness of our verbal behavior about behavior.

Additional communicative convenience has been accomplished by adopting abbreviations or symbols for the main behavioral effects, thus S^D and S^r for discriminative stimulus and conditioned reinforcer, respectively. S^R and S^P and S^P can also be used for unconditioned reinforcer, unconditioned punisher, and conditioned punisher respectively, all three of which are repertoire-altering functional relations. In the respondent case, the traditional US for unconditioned stimulus can be reinterpreted as either UE or UC for unconditioned elicitor and unconditioned conditioner. Assuming the existence of higher

order conditioning, the traditional CS for conditioned stimulus can be reinterpreted as either CE or CC for conditioned elicitor and conditioned conditioner. The respondent evocative effects then are those of the UE and CE; the respondent repertoire-altering effects are those of the UC and CC.

In the earlier paper unconditioned and conditioned motivative variables were also included, the unconditioned establishing operation (UEO) and the conditioned establishing operation (CEO). These are evocative functional relations, however, and are not germane to the main point of the present paper. More relevant are the repertoire-altering effects of a static environment, a failure of the environment to change in the way that had previously altered the organism's repertoire. In the respondent case, when the conditioned elicitor occurs by itself—respondent extinction—the repertoire is altered in that the future capacity of that stimulus to elicit its conditioned response is decreased. In the operant case when the response occurs and is not followed by the relevant reinforcement the future frequency of that type of behavior in that situation is decreased. Similarly the weakening effect of punishment is itself weakened by the occurrence of the response without the punishing consequence.

It is important at this point to reiterate the specificity of the referents of our technical terms in spite of the multiplicity of behavioral effects produced by a single physical event. The operation of a food dispenser in the presence of a food-deprived organism is an environmental event that has multiple behavioral effects. The sound of the dispenser (after appropriate magazine training) will typically (a) elicit salivation illustrating the respondent function of this auditory stimulus as a conditioned elicitor (CE); (b) it will occasion approach to the food tray illustrating its operant discriminative function (S^D); (c) and it will increase the future frequency of the type of behavior that immediately preceded this visual stimulus, illustrating its function as a conditioned reinforcer (S^r). But even though the sound of the dispenser typically has all three effects, it is only the last one that justifies our reference to this sound as a conditioned reinforcer. The other effects are neither necessary nor sufficient for

appropriate use of the term "reinforcer."

Terminological specificity is especially important in dealing with what is called "aversive control," itself an inconveniently unspecific term. Consider painful stimulation as produced electrically and used in the study of escape and avoidance behavior with nonhuman animals. There are two main *evocative* effects of the *onset* of the painful stimulus. It functions as UE (unconditioned elicitor) for various smooth muscle and glandular responses (sometimes called the activation syndrome) as well as for some striped muscle reflex responses depending on the nature of the contact with the painful stimulus. It also functions as UEO (unconditioned establishing operation) in that it evokes any behavior that has been reinforced by termination of the painful stimulus. (This second function is often erroneously described as a discriminative one. For details of the argument for its being *motivative*—like that of deprivation—rather than *discriminative*, see Michael, 1982.) Pain *onset* also has at least two main repertoire-altering effects. It functions as UC (unconditioned conditioner) in that any other stimuli present at the moment of pain onset will themselves become capable of eliciting some of the smooth muscle and gland responses that were elicited by the pain onset as UE. This first effect could only be observed when these previously neutral stimuli occur again in the same context and in the absence of the painful stimulation. It functions as S^P (unconditioned punishment) for whatever behavior immediately preceded the onset of the painful stimulation, in that such behavior will be less likely to occur again in the same context and with the painful stimulation *not* present. The *offset* of the painful stimulation also has several *evocative* (the "undoing" of the UE and UEO functions of pain onset) and repertoire-altering functions, the most important of the latter being the S^R (unconditioned reinforcement) function with respect to the behavior that immediately preceded the offset. This last effect could, of course, only be observed as an increase in the strength of the relevant behavior when the painful stimulus was again present to function as UEO for that behavior.

There is clear advantage to a set of terms

which is specific to each of these different kinds of effects, and any multiple reference leads to confusion in communication and also in one's own ability to provide an adequate analysis of such situations. To refer to the pain, for example, as punishment, and then to cite as evidence of this relationship either the respondents elicited by the pain, the occurrence of appropriate escape behavior, or the reinforcing effects of pain removal is a completely inadequate analysis. Only the decreased future frequency of the behavior that immediately preceded the pain onset is appropriate evidence for its punishment function.

All of the repertoire-altering effects discussed above— S^R , S^P , S^r , S^p , operant extinction, UC, CC, and respondent extinction—are changes in repertoires that were first identified and have been most extensively studied in nonhuman laboratory settings. In these experiments the changes have been brought about by events that are very close in time to the relevant response or stimulus. (The following discussion will consider only operant functional relations, but I think the same general conclusions apply as well to respondent relations.) Thus "reinforcement" refers to an increase in the future frequency of a type of behavior because a response of that type was followed by a particular type of consequence, and "followed" means "occurred within a few seconds of the response." "Punishment" refers to a decrease in future frequency of a type of behavior because it was followed immediately by a different type of consequence. Laboratory efforts to develop nonhuman behavior with delayed consequences are singularly unsuccessful. This is easily demonstrated when one tries to shape some new topography in a rat or pigeon. Any delay in reinforcement not only fails to strengthen the relevant response, but strengthens whatever other behavior it immediately follows, which behavior then occurs more frequently and displaces the approximations to the desired response. Although not studied as much, nor as simply conceptualized, delayed punishment is also ineffective on the behavior from which it is delayed, and all too effective on other behavior which it follows more immediately.

Remote Contingencies

The extension of the concepts and principles of the nonhuman respondent and operant laboratory to human behavior has been supported by human laboratory research as well as successful application of these principles to practical problems in the human services, education, business and industry, and other areas. It is important, nevertheless, to clearly identify situations where the extension is unjustified. A commonly occurring instance of such unjustified extension is a stimulus-response-consequence contingency where the consequence occurs minutes, hours, or days after the stimulus and response. Suppose a research scientist spends a good deal of time and effort preparing a grant application to a government agency. Typically notification of the decision to fund the grant comes several months after the grant has been submitted. If the grant is approved it is reasonable to assume—and casual evidence certainly supports the assumption—that the scientist will be more likely to submit such grant applications in the future. Behavioral psychologists might—and often do—speak of such approval as “reinforcement” for writing grant requests, with the implication that this episode is to be understood as an instance of the operant conditioning that has been studied in the nonhuman laboratory. It is quite clear, however, that if it were not for an extensive verbal repertoire and social history involving such events the grant approval could have no effect whatsoever on grant writing. Assume instead of grant approval that a notification of an unexpected and large inheritance were received—also several months after the grant application had been sent in. No one would even suggest any effect of the inheritance notification on grant writing. The cognitivist would deal with this situation by pointing out that the researcher “knows” that there is a causal relation between grant writing and grant approval, and knows that there is no such relation between grant writing and inheritances, and that this knowledge (in combination with some other explanatory fictions) is what is responsible for the increase in grant writing. We should not, of course, allow ourselves the luxury of inventing mental solutions to such problems, but neither should we overlook the striking differences between

this situation and the research setting in which our concepts and principles evolved.

It is quite reasonable to assume that the grant notification does in fact function as reinforcement and thus we might expect a future increase in the strength of letter-opening behavior or possibly even the tendency to go to the mail room where the notification was received. The notification (grant or inheritance) would also probably function as a CE (conditioned elicitor) with respect to a number of emotional responses, and would certainly function as S^D (discriminative stimulus) for a variety of responses related to social approval from others under such occasions. All these effects can be interpreted in terms of our technical behavioral concepts and principles, but not the increase in grant writing which would probably occur. That repertoire-altering effect, although properly attributed to the grant notification, must be analyzed in terms of existing verbal repertoires, history with respect to similar events, rule-governed behavior (Skinner, 1969), verbal stimulus equivalences (Sidman and Tailby, 1982), and probably other behavioral processes and functions. I don't mean to suggest that the analysis cannot be made in behavioral terms—those are the only terms that will ever be really relevant—but rather that our present research bases with nonhumans, in applied human settings, and in the human laboratory, have not yet resulted in support for anything other than speculation about this type of human repertoire-altering effect.

The grant writing example should not be thought of as an unusual exception to the rule of appropriate verbal practice. It may well be that most of our examples showing the effects of reinforcement and punishment with normal, highly verbal humans are oversimplified in the same sense. The humanly important effects of important consequences are seldom the changes in strength of the behavior immediately preceding the consequence. The essence of human superiority over nonhuman organisms is in our control by remote contingencies, which at another level is a major advantage of the educated person over the uneducated. But it is a drastic oversimplification to interpret the effects of remote contingencies as nothing other than the the well-known and well-researched effects of behavioral consequences.

Perhaps it will help to have terms for two different kinds of repertoire-altering effects; those which *are* straightforward extensions of the existing and well-understood functional relations (UC, CC, S^R, S^P, S^r, S^p, and a few others) and those which because of the time delay between behavior and consequence (probably anything greater than 30 seconds) must be interpreted as the result of a number of interacting variables. Malott (1984) has suggested "direct-acting" and "indirect-acting" for these two kinds of effects (for Malott the indirect-acting effects arise from gradual and probabilistic consequences as well as delayed ones).

Some indirect-acting effects are fairly well understood, although often taken for granted in that they are insufficiently analyzed. When the delay in reinforcement is of the order of seconds or even minutes, the relation of a particular type of behavior to its ultimate effective consequence may be an instance of simple chaining. If response #3 systematically produces stimulus #2 which functions as S^r (conditioned reinforcement) for that response and S^D (discriminative stimulus) for response #2, which in turn produces stimulus #1 which functions as S^r for response #2 and S^D for response #1, which produces S^R (unconditioned reinforcement) for response #1, the earlier response (#3) may be well maintained even though the ultimate consequence is temporally quite remote. Even here, however, it would be a mistake to refer to this ultimate reinforcement as related directly to response #3. The relation is effective only because of the formation of conditioned reinforcers, and in this sense is dependent upon this additional process. This particular process is fairly well understood, and in fact is assumed to play an important role even in cases of what is called "immediate" reinforcement. Note that in the earlier description of the multiple effects of the sound of the food dispenser there was a parenthetical reference to appropriate magazine training, the procedure that results in the sound becoming an effective form of conditioned reinforcement. Even in the seemingly simple laboratory situation the relation between the behavior of interest and the food that is delivered is an example of an indirect-acting effect, although this fact can probably be ignored for most purposes. However, chaining is not a process that can

be taken for granted in all cases of effective delayed reinforcement. In the nonhuman laboratory or in work with nonhumans for practical or entertainment purposes a special kind of training—backward chaining—must be explicitly provided in order for ultimate consequences to have their indirect-acting effect on behavior, and when the only response produced stimuli are kinesthetic the training is much more difficult and the analysis more speculative. Finally, to interpret the effects of consequences where the delay is on the order of hours or days as this type of chaining is quite unjustified, unless an *uninterrupted* chain of responses and response-produced stimuli can be identified, since any interruption simply locates the problem of delay at a different point in the behavioral sequence.

Some areas where indirect-acting effects are often treated as though they were direct acting are behavioral contracting, self-management, community applications (the control of littering, energy use, etc.), interpretations of broad cultural phenomena such as the effects of third party payments on clinical practice and the effects of insurance policies on safety behavior, and especially the rapidly growing area referred to as organizational behavior management. In this latter field most incentive programs in which consequences are specifically related to quantity and/or quality of job performance involve consequences provided long after the relevant behavior; likewise most efforts to control tardiness, absenteeism, safety in the workplace, and company theft. The reinforcers used are monetary bonuses, time off, favorable work schedules, opportunity for advanced training, mention in a newsletter or on a wall poster, etc. all of which are provided long after the behavior that is of importance to management and could only have a direct strengthening effect on various trivial behaviors such as opening pay envelopes, approaching wall charts, and so on. One form of reinforcement often recommended by OBM consultants is praise by supervisors, which might seem to have useful direct-acting effects, but see the section below on two other clues to the involvement of indirect-acting complexities.

It may be helpful to consider an OBM type of example in some detail. Suppose an employer of a small factory approaches an

OBM consultant because the workers typically arrive late in the morning. Such a consultant might well be expected to inquire about existing consequences for being on time or for being late. The manager admits that there is clearly no positive consequence for being on time, and not much of a negative consequence for being late even by as much as 30 minutes or so. Of course repeated occurrences of extreme tardiness lead to warnings and ultimate discharge if continued, but this seldom happens. Work is supposed to begin at 8 A.M. but things don't really get going until around 8:45 by which time most everyone has arrived. It would not be atypical at this point for the OBM consultant to give the manager a brief lecture on the fact that behavior is known—as a result of scientific investigation—to be a function of its consequences, and if he wants workers to be on time he is going to have to provide something positive for being on time, or something negative for being late, or possibly both. The positive approach is favored by most OBM consultants so, assuming that the manager agrees, the consultant might institute a lottery system for coming to work on time. Either through some time-clock punch in, or through the efforts of a person appointed to the task, workers arriving before 8 A.M. are provided with a lottery ticket as they come in the factory entrance. They put their names on the tickets and at the end of the week a drawing is held and several winners are given dinner-for-two at a local restaurant, or some other such "reinforcement." The consultant believes, and perhaps quite correctly, that this procedure will lead to a considerable decrease in late arrivals, and he justifies this procedure in terms of the law of effect, as a well-verified principle of behavior. It is, of course, the relation between the lottery tickets and the prizes that can be obtained if one's ticket is drawn that makes the ticket valuable. This is a type of token system, which though somewhat complex, is not too difficult to understand in relatively precise behavioral terms. Let us, then, assume that for many of the workers the lottery tickets are, themselves, effective forms of conditioned reinforcement. How might they induce an individual who is often late to work to be more regularly on time? As a direct-acting effect of reinforcement we might well expect

an increase in locomotion through the factory entrance, or even from the parking lot, as a result of repeated exposure to the lottery ticket contingency. The trouble is that workers are not late to work because they don't walk rapidly enough through the factory entrance, or from the parking lot. My mother used to tell me "It does no good to hurry. You have to start on time." And any effect of the lottery ticket on "starting on time" is most likely the result of verbal and other complex processes occurring in the evening after coming home from work (setting the alarm clock to an earlier wake-up time) or in the morning prior to leaving for work (quicker perusal of the morning newspaper).

The manager should actually have given the consultant a counter lecture on the topic of the devastating effects of even short delays of reinforcement, as found in laboratory investigations of operant behavioral relations. He should have demanded that the consultant either provide a derivation of his expected effect from known principles of behavior that overcomes the problem of the consequence delays of minutes or hours, or provide some other rationale. The consultant would probably not have been able to provide such an analysis, or at best it would have been highly speculative. About all that he could do given our current understanding of such complexities is to tell the manager that a similar procedure was quite successful at a similar factory, or if such information was unavailable, appeal to his common sense, and point out that in any case we can try it and if it isn't cost effective we can come up with something else to try. This more modest approach, though possibly not permitting as high a fee—there is some monetary advantage to technical jargon—is safer in the long run, and is all that is really possible at present.

In addition to a delay between response and consequence of more than 30 seconds there are two other clues that a behavior change is probably due to indirect-acting effects. One is that the behavior shows some increase in strength prior to occurrence of the consequence, and the other is that a single occurrence of a consequence produces a large change in behavior. When a neighborhood youth is offered \$5 to mow your lawn, and then does so it is common to

refer to the \$5 as the reinforcement for mowing the lawn with the implication that this behavior is to be understood as an instance of operant conditioning, with the money as the relevant reinforcement. But he mowed the lawn before he got the money, so that instance of mowing can't possibly be attributed to that \$5. We speak of that instance of mowing being related to past promises that were fulfilled, similarities between those circumstances and the present one, and so on, but we speculate, and typically after the fact. Even if we confine ourselves to mowings that occurred after receipt of the \$5 it is still risky to suppose that we are now dealing with simple operant conditioning, since the variables that controlled the first mowing are possibly still present and could continue to play a role. A critic might point out that kids won't mow very often if you promise to pay and then renege. True, but our belief in this common wisdom is not based on our understanding of the laboratory phenomenon of operant extinction, nor does it presently help our understanding of this situation in any simple way to have studied the science of behavior in its present form. In a practical sense it may help to know about other studies of mowing or similar tasks and their relation to pay, but it helps in the way that knowledge of the experience of others helps and not in the way that all science helps.

The second additional clue to the involvement of indirect-acting effects is a large behavioral change resulting from a single instance of reinforcement or punishment. This is especially true when what has come to be called "descriptive praise" is used. When the supervisor says "George, I really like the way you're cleaning up that spill before anyone steps in it and falls down." and George cleans up his spills from that time forward, we should suspect that the praise functioned not as reinforcement but rather as a form of instruction, and that George for various reasons, provided himself with a similar instruction every time another spill occurred. Behavioral analyses of this process are just beginning to be made, but it certainly shouldn't be interpreted as a simple instance of operant conditioning. Even when a consequence is not accompanied by a description of the relevant contingency, the occurrence of the consequence

may evoke a description by the person receiving it, and this self-produced description may have important effects, though at present we only speculate about such a process.

The approach implied by the arguments given above is that we should refrain from using our technical terms for repertoire-altering functional relations when talking about indirect-acting effects. Incorrectly used technical language is worse than common-sense language since it suggests an expertise which is not present, and by implying that the situation is well understood may head off serious attempts to understand it. Until we are able to provide an accurate analysis of the complex processes that are relevant to any particular instance of an indirect-acting effect we are better off using ordinary descriptive terms. Thus, say "The successful grant application is *likely to encourage* future efforts in the same direction," and don't say it as though you had the science of behavior behind you. Stop referring to successful strike settlements as reinforcement for striking behavior, and the successful election of a political candidate as reinforcement for voting behavior. Likewise, when someone does something that you like, stop saying "That's very reinforcing." unless you wish to direct the listener's attention to the usually trivial direct-acting effects that might be produced. It would not be inappropriate to say "That's very eliciting." in reference to the effect of the favor as a CE (conditioned elicitor), but it would probably be better to just say "Thank you." Don't talk about good grades as reinforcement for effective study behavior, although they are no doubt responsible for maintaining it in some cases. Just say that they're responsible for maintaining it. This may deprive some of us of an opportunity to (incorrectly) display our technical knowledge, but so much the better.

Aside from restricting technical terms to those situations meeting all requirements for their application, and using everyday language in other situations there are several other approaches that might be taken, none very satisfactory. It is sometimes suggested that our large brain permits us to react to delayed contingencies as though they were immediate ones, and thus we can simply ignore the delay. Of course our large brain would also have to avoid linking the conse-

quence with the various other behaviors that occurred between the relevant response and the consequence, which gets us back to "knowing what is related to what," and this appears to depend on the existence of a verbal repertoire and the occurrence of relevant verbal responses under the proper circumstances. From the perspective of what can be called "pop sociobiology" it is sometimes pointed out that there would be considerable survival value in the ability to be affected by remote contingencies, but more analysis is needed. There would be considerable survival value in certain kinds of ESP as well. It is sometimes suggested that the role of verbal behavior and other such complexities may simply be to permit remote contingencies to affect us as though they were immediate. While this is undoubtedly true to some extent, and under some circumstances, remote contingencies by no means always affect us as though they were immediate, and until more detail is available this is a relatively useless generalization. It may not be inappropriate to advise that having no other information one should act toward a remote contingency as though it was immediate, which is sort of like saying that having no other information one should purchase more expensive items since they are usually of better quality. We will benefit considerably from obtaining the other information.

In a simple operational sense it could be argued that "reinforcement" is usually defined as "an environmental change which increases the future frequency of any behavior that precedes it." Therefore, if the grant writing behavior increased in frequency the grant approval should be considered an instance of reinforcement. It is true that most formal definitions of reinforcement do not include a temporal qualification in their definition (likewise with punishment), but it is there by implication when they cite the results of research with nonhuman species as the basis for the science of behavior being explained and extended to the human condition. To ignore the implied temporal requirement is to use the same term for effects that are based on quite different behavioral processes, a verbal practice that is quite detrimental to effective technical communication.

Another approach is to cite the molar

orientations currently under study in the nonhuman experimental literature. These deemphasize strict temporal contiguity as the defining feature of the reinforcement (or punishment) contingency, in favor of the effects of responding on overall reinforcement frequency. The correlation-based law of effect of Baum (1973) is an example of such an approach. However, it should be remembered that proponents of such molar approaches are dealing with much shorter time spans than those involved in most indirect-acting effects of the type described above, and even for those time spans (typically variable interval schedules are used where a response may alter the rate of reinforcement during the next several minutes although it has no immediate consequence) the point is quite controversial (for example, see Vaughan, 1984). The notion of a correlation-based law as an explanation of changes in behavior due to effects that are hours or days removed from the relevant behavior has not, to my knowledge, been seriously proposed by those most involved in such research.

As a final point it is appropriate to consider the seeming paradox that although our treatment of indirect-acting effects as though they were direct-acting is quite unjustified, we have nevertheless been moderately successful from a practical perspective. Reconsider the rapidly growing area of organizational behavior management, an area that is providing employment for an increasing number of behaviorally oriented psychologists at both the M.A. and the Ph.D. level. It is quite clear from the many published reports and conference presentations that these behaviorally oriented psychologists are often able to effect considerable improvements in various aspects of organizational behavior. It is also clear that these improvements are usually related to the manipulation of behavioral consequences, which are temporally quite remote from the relevant behavior. It is a somewhat unusual situation where weakness in theory is accompanied by considerable success in practice.

I think there are several reasons for the success. First, some of the problems dealt with in this area do involve direct-acting contingencies. Some of the uses of supervisor praise are of this sort. Some incentive pro-

grams involve the installation of counters or other devices which provide stimulus changes immediately contingent on important features of the work activity. Interventions of this sort would not likely be thought of unless one had a behavioral perspective, and especially when the relevant stimulus changes are not the type that evoke comment by the recipient.

Many of the improvements have been made in settings where behavior has traditionally been "understood" in terms of a constantly changing variety of mentalistic concepts and principles. Many of these explanatory fictions direct attention away from environmental variables which, even from only a common-sense point of view are important sources of organizational behavior. The behaviorist is relatively immune to such "inner directedness" and is, in fact, especially prepared to look for manipulable environmental variables.

Perhaps the most important reason for success is the empirical and scientific orientation coupled with a powerful research methodology. This methodology, in contrast with what was in effect prior to the behaviorist's appearance on the scene, emphasizes direct observation involving an easily understood form of quantitative measurement (usually frequency of occurrence of something), high standards of measurement reliability, and

single-subject experimental designs that permit assessment of an effect under conditions inappropriate for traditional group comparisons. With this methodology the practitioner can be successful, in a statistical or average sense, irrespective of the incompleteness of available theory, and irrespective of verbal practices that are possibly inappropriate.

But even though one may be able to do good works without talking about it correctly, I can't help but believe that even better works are possible when verbal practices are not seriously flawed.

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